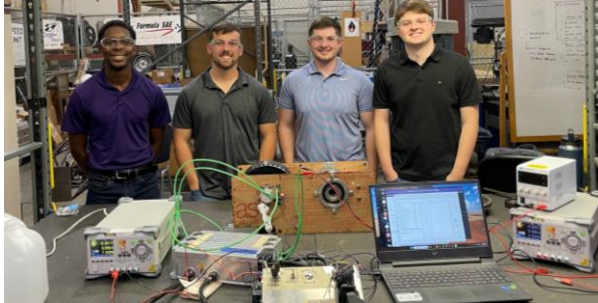


# FSAE EV POWER CONFIGURATION

## UAH Fall 2024 - ECE Senior Design Project

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### Can't Believe It's Not Tesla

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In the photo above was our UAH EE senior design team Can't Believe It's Not Tesla. From left to right, Raymond White(Team Lead), Will Kwasigroh(Research Lead), Brendan O'connor(Hardware Lead), and Garrett Smith(Software Lead).

### Project Overview

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This senior design project is focused on developing a novel electric powertrain for a Formula SAE competition vehicle. Our objective is to integrate an EMRAX 228 V motor with a Cascadia PM100DX inverter, leveraging this combination to produce a powerful yet controllable drive system optimized for the strict demands and regulations of Formula SAE racing. Our key goals include establishing communication between the motor and controller, ensuring smooth torque delivery, while adhering to the strict guidelines and regulations of the FSAE. In short, our project aims to create a reliable electric powertrain system, marking a major milestone as it successfully operates for the first time in this configuration. This setup represents a

foundational achievement in ensuring that the system is functional and ready for further enhancements in the Formula SAE vehicle.

### Technical Specs

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Our motor configuration features the EMRAX 228V, a high-performance motor known for its compact design and powerful output, specifically suited for electric vehicle applications in racing. To manage the power delivery to the motor, we integrated a Cascadia PM100DX inverter, which regulates the flow of power to ensure smooth acceleration, deceleration of the motor under varying conditions. For precise feedback on motor position, we're using a Tamagawa Resolver, providing critical data for the system's control algorithms to maintain stability and responsiveness during system operations.

The logic control interface includes a throttle pedal, a brake button, and a switch allowing the driver to shift between forward, neutral, and reverse modes. This setup allows for full command over the motor, giving drivers the ability to adjust power levels according to track conditions and competition requirements. This configuration is designed to operate within strict safety and performance guidelines, meeting the strict standards required for Formula SAE vehicles.